landfall near the northern part of Core Sound in September 2003 as a category 2 storm, predation of cownose rays on bay scallops, or a combination of these factors.

The red tide resulted in the closure of 1,480 km^2 of North Carolina waters to shellfish harvesting and an economic impact of over $24 million (Tester and Fowler 1990). Affected waters were closed to the harvest of shellfish because toxins produced by *K. brevis* accumulate in the bodies of filter feeders such as clams and oysters and can cause neurotoxic shellfish poisoning when consumed. Even though only the adductor muscle of bay scallops is eaten and this tissue does not generally retain toxins, the harvest of bay scallops was also prohibited because they were found to contain much larger concentrations of toxins in their bodies than clams or oysters (P. Fowler, North Carolina Division of Environmental Health, personal communication). The red tide had a particularly large impact on shellfishermen since waters were closed to any harvest from as early as November to as late as May.

The red tide did not cause mortality in clams or oysters; however, there was a significant loss of bay scallops. Those bay scallops that remained had emaciated meats and were not getting good prices at market. The cause of bay scallop mortality is not entirely clear. The red tide killed both adult and newly recruited bay scallops resulting in a recruitment failure. Summerson and Peterson (1990) found that recruitment was virtually eliminated from Bogue and Back sounds where densities of new recruits were found to average 2% of pre-red tide years. The trend continued in the two years following the red tide, with average recruitment rates about 29% of normal in Back Sound and about 5% of normal in Bogue Sound (Peterson and Summerson 1992). A similar problem was found during a brown tide event in Long Island Sound, NY that caused mortality and severe reduction in tissue weights of adult bay scallops and a subsequent recruitment failure (Kuenster and Bricelj 1988). Summerson and Peterson (1990) found that juvenile densities during the red tide were near normal in central Core Sound, and a later study found that recruitment rates remained normal in Core Sound (Peterson and Summerson 1992).

Low population abundances are likely to continue until the spawning stock increases. Peterson and Summerson (1992) stated that Bogue Sound may be slow to recover from the effects of the red tide because the spawning stock for that basin was too